WHAT IS CLAIMED IS:

1. An optical coupling device comprising:

a light outgoing member, having an array of a plurality of light outgoing portions, for allowing light to go out of each of said plurality of light outgoing portions;

a light incoming member having a plurality of light incoming portions arrayed in such a manner as to correspond to said light outgoing portions; and

an optical lens array having a lens substrate made from an optical material and a plurality of optical lens portions arrayed on said lens substrate in such a manner as to correspond to said light outgoing portions;

wherein a light ray, which has gone out of each of said light outgoing portions of said light outgoing member, is coupled to the corresponding one of said light incoming portions of said light incoming member by said optical lens array.

2. An optical coupling device according to claim 1, wherein said light incoming member is an array of a plurality of optical fibers.

3. An optical coupling device according to claim 2, wherein said light outgoing member is a light emitting device array having an array of a plurality of light

emitting portions.

4. An optical coupling device according to claim 3, wherein said light emitting device array is formed by arraying said light emitting portions on a light emitting device substrate.

5. An optical coupling device according to claim 3, wherein said light emitting portions are arrayed in line, said optical fibers are arrayed in line, and said optical lens portions are arrayed in line.

6. An optical coupling device according to claim 3, wherein said light emitting portions are arrayed in lines, said optical fibers are arrayed in lines, and said optical lens portions are arrayed in lines.

7. An optical coupling device according to claim 3, wherein said optical fibers are arrayed in such a manner that outer peripheral portions of adjacent two of said optical fibers are in contact with each other.

8. An optical coupling device according to claim 3, wherein said light emitting device array is a semiconductor laser array.

9. An optical coupling device according to claim 3, wherein said light emitting portions are two-dimensionally arrayed, said optical fibers are two-dimensionally arrayed, and said optical lens portions are

two-dimensionally arrayed.

10. An optical coupling device according to claim 9, wherein said light emitting device array is a light emitting diode array.

11. An optical coupling device according to claim 9, said light emitting device array is a plane emission type semiconductor laser array.

12. An optical coupling device according to claim 3, wherein each of said optical lens portions of said optical lens array is formed into a convex shape on said lens substrate.

13. An optical coupling device according to claim 3, wherein a light absorber having apertures is formed on said lens substrate of said optical lens array.

14. An optical coupling device according to claim 12, wherein said optical lens array is formed by arraying said optical lens portions on a flat surface of said lens substrate.

15. An optical coupling device according to claim 14, wherein a groove is formed, in said optical lens array, at a boundary between each of said convex-shaped optical lens portions and the flat surface of said lens substrate.

16. An optical coupling device according to claim

1, wherein said light outgoing member is an array of a plurality of optical fibers.

17. An optical coupling device according to claim 16, wherein said light incoming member is a light receiving device array having an array of a plurality of light receiving portions.

18. An optical coupling device according to claim 17, wherein said light receiving device array is formed by arraying said light receiving portions on a light receiving device substrate.

19. An optical coupling device according to claim 17, wherein said optical fibers are arrayed in line, said light receiving portions are arrayed in line, and said optical lens portions are arrayed in line.

20. An optical coupling device according to claim 17, wherein said optical fibers are arrayed in lines, said light receiving portions are arrayed in lines, and said optical lens portions are arrayed in lines.

21. An optical coupling device according to claim 17, wherein said optical fibers are arrayed in such a manner that outer peripheral portions thereof are in contact with each other.

22. An optical coupling device according to claim 17, wherein said optical fibers are two-dimensionally

arrayed, said light receiving portions are two-dimensionally arrayed, and said optical lens portions are two-dimensionally arrayed.

23. An optical coupling device according to claim 17, wherein said light receiving device array is a photodiode array.

24. An optical coupling device according to claim 17, wherein each of said optical lens portions of said optical lens array is formed into a convex shape on said lens substrate.

25. An optical coupling device according to claim 17, wherein a light absorber having apertures is formed on said lens substrate of said optical lens array.

26. An optical coupling device according to claim 24, wherein said optical lens array is formed by arraying said optical lens portions on a flat surface of said lens substrate.

27. An optical coupling device according to claim 26, wherein a groove is formed, in said optical lens array, at a boundary between each of said convex-shaped optical lens portions and the flat surface of said lens substrate.

28. An optical coupling device according to claim 1, wherein part of each of said light incoming member and

said light outgoing member is an array of a plurality of optical fibers.

29. An optical coupling device according to claim 28, wherein the rest of said light outgoing member is a light emitting device array having an array of a plurality of light emitting portions, and the rest of said light incoming member is a light receiving device array having an array of a plurality of light receiving portions.

30. An optical coupling device according to claim 29, wherein said light emitting portions of said light emitting device array as the rest of said light outgoing member and said light receiving portions of said light receiving device array as the rest of said light incoming member are arrayed on the same device substrate.

31. An optical coupling device according to claim 29, wherein said light emitting portions and said light receiving portions are arrayed in line, said optical fibers are arrayed in line, and said optical lens portions are arrayed in line.

32. An optical coupling device according to claim 29, wherein said light emitting portions and said light receiving portions are arrayed in lines, said optical fibers are arrayed in lines, and said optical lens

portions are arrayed in lines.

33. An optical coupling device according to claim 29, wherein said optical fibers are arrayed in such a manner that outer peripheral portions thereof are in contact with each other.

34. An optical coupling device according to claim 29, wherein said light emitting portions and said light receiving portions are two-dimensionally arrayed, said optical fibers are two-dimensionally arrayed, and said optical lens portions are two-dimensionally arrayed.

35. An optical coupling device according to claim 29, wherein said light receiving device array is a photodiode array.

36. An optical coupling device according to claim 29, wherein said light receiving device array is a plane emission type semiconductor laser array.

37. An optical coupling device according to claim 29, wherein said light receiving device array is a photodiode array.

38. An optical coupling device according to claim 29, wherein each of said optical lens portions of said optical lens array is formed into a convex shape on said lens substrate.

39. An optical coupling device according to claim

29, wherein a light absorber having apertures is formed on said lens substrate of said optical lens array.

40. An optical coupling device according to claim 38, wherein said optical lens array is formed by arraying said optical lens portions on a flat surface of said lens substrate.

41. An optical coupling device according to claim 40, wherein a groove is formed, in said optical lens array, at a boundary between each of said convex-shaped optical lens portions and the flat surface of said lens substrate.

42. An optical coupling device according to claim 1, wherein said plurality of optical lens portions of said optical lens array are formed by a manner of forming a plurality of mask layer portions, which have a pattern corresponding to a specific array pattern of said plurality of optical lens portions and also have shapes corresponding to shapes of said plurality of optical lens portions, on a lens substrate made from an optical material, and simultaneously removing said mask layer portions and part of said lens substrate by etching, to transfer the shapes of said mask layer portions to said lens substrate.

43. An optical coupling device according to claim

42, wherein before etching, said plurality of mask layer portions are subjected to a treatment in which the shape of each of said mask layer portions is deformed in such a manner that a surface area thereof is reduced.

44. An optical coupling device according to claim 43, wherein said treatment for deforming the shape of each of said mask layer portions is a heat-treatment.

45. An optical coupling device according to claim 42, wherein said plurality of mask layer portions are obtained by forming a mask layer made from a photosensitive material and patterning said mask layer into said plurality of mask layer portions by exposure and development.

46. An optical coupling device according to claim 44, wherein said heat-treatment is performed at a temperature higher than a glass-transition temperature of a material for forming said mask layer portions.

47. An optical coupling device according to claim 44, wherein said heat-treatment is performed at a temperature lower than a carbonization temperature of a material for forming said mask layer portions.

48. An optical coupling device according to claim 44, wherein said heat-treatment is performed at a temperature higher than room temperature which is a

temperature required for reserving a material for forming said mask layer portions.

49. An optical coupling device according to claim 42, wherein said etching for simultaneously removing said mask layer portions and part of said lens substrate is dry etching.